AMENDMENTS TO THE CLAIMS

19. (Previously Presented) A device, comprising:

a substrate of a semiconductor material;

an array of sensing pixels fabricated over said substrate, each sensing pixel being responsive to input radiation to produce a pixel output representative of received radiation by said sensing pixel, wherein said sensing pixels are formed of multiple pixel layers; and

an optical mask layer formed over said substrate in an optical path of the input radiation, said optical mask layer having a plurality of optical elements to modify a property of the input radiation prior to detection by said sensing pixels, and wherein at least one layer of said multiple pixel layers is formed over said optical mask layer.

20. (Previously Presented) The device as in claim 19, wherein said optical mask layer is formed atop of at least one layer of said multiple pixel layers.

21. (Previously Presented) The device as in claim 19, wherein said multiple pixels layers forming said sensing pixels are fabricated on said substrate, and wherein said optical mask layer is between said multiple pixel layers and said substrate.

22. (Previously Presented) The device as in claim 19, wherein multiple pixel layers forming said sensing pixels include a first set of contiguous multiple pixel layers and a second set of contiguous pixel layers fabricated on said substrate, and wherein said optical mask layer is formed between said first set and said second set.

23. (Previously Presented) The device as in claim 19, wherein each optical element focuses the input radiation to a corresponding sensing pixel underneath said each optical element.

24. (Previously Presented) The device as in claim 23, wherein said sensing pixels are formed of a first set of contiguous multiple pixel layers and a second set of contiguous pixel layers fabricated on said substrate, and wherein said optical mask layer is formed between said first set and said second set.

25. (Previously Presented) The device as in claim 19, wherein each optical element selectively separates one color in the input radiation from another different color in the input radiation.

26. (Previously Presented) The device as in claim 25, wherein said optical mask layer is between said multiple pixel layers and said substrate.

27. (Previously Presented) The device as in claim 25, wherein each optical element spatially covers only one sensing pixel.

28. (Previously Presented) The device as in claim 25, wherein each optical element covers at least two adjacent sensing pixels.

29. (Previously Presented) The device as in claim 19, wherein each sensing pixel is an active pixel which has in-pixel circuit elements to covert radiation-induced charge into a current or voltage.

30. (Previously Presented) The device as in claim 19, wherein each optical element spatially covers only one sensing pixel.

31. (Previously Presented) The device as in claim 19, wherein each optical element spatially covers at least two adjacent sensing pixels.

32. (Previously Presented) The device as in claim 19, wherein each optical element both focuses a beam and spectrally filters the same beam.

33. (Previously Presented) The device as in claim 19, wherein each optical element is optically absorptive.

34. (Previously Presented) The device as in claim 19, wherein each optical element is optically reflective.

35. (Previously Presented) The device as in claim 19, wherein each optical element is optically refractive or diffractive.

36. (Currently Amended) A device, comprising:

a substrate of a semiconductor material;

a plurality of pixel layers formed over said substrate and patterned to define an array of sensing pixels, each sensing pixel being responsive to input radiation to produce a pixel output representative of received radiation by said sensing pixel;

a first optical mask layer formed over said substrate in an optical path of the input radiation, said first optical mask layer having a plurality of optical elements to optically interact with the input radiation; and

a second optical mask layer formed between said first optical mask layer and said substrate, said second optical mask layer separated from said first optical mask layer by a set of contiguous pixel layers and having a plurality of optical elements to optically interact with the input radiation that [[pass]] passes through said first optical mask layer.

37. (Previously Presented) The device as in claim 36, wherein each optical element in said first and second optical mask layers focuses received radiation.

38. (Previously Presented) The device as in claim 36, wherein each optical element in said first optical mask layer focuses received radiation and each optical element in said second optical mask layer separates one color from another different color in the input radiation.

39. (Previously Presented) The device as in claim 36, wherein said second optical mask layer is formed between said pixel layers and said substrate, and said first optical mask layer is formed atop of said pixel layers.

40. (Previously Presented) The device as in claim 36, wherein each sensing pixel is an active pixel which has in-pixel circuit elements to convert radiation-induced charge into a current or voltage.

41. (Previously Presented) A device, comprising:

a substrate of a semiconductor material;

an array of sensing pixels fabricated over said substrate, each sensing pixel being responsive to input radiation to produce a pixel output representative of received radiation by said sensing pixel; and

an optical mask layer formed over said substrate in an optical path of the input radiation, said optical mask layer having a plurality of optical elements to modify a property of the input radiation prior to detection by said sensing pixels, wherein each optical element both focuses a beam and spectrally filters the same beam.

42. (Previously Presented) The device as in claim 41, wherein said sensing pixels are formed of multiple pixel layers, and wherein at least one layer of said multiple pixel layers is formed over said optical mask layer.

43. (Previously Presented) The device as in claim 42, wherein said optical mask layer is formed atop at least one layer of said multiple pixel layers.

44. (Currently Amended) The device as in claim 41, wherein said sensing pixels are formed of multiple pixel layers, and wherein said optical mask layer is formed atop at least one of said multiple pixel layers.

45. (Previously Presented) The device as in claim 41, wherein said optical mask is formed over said sensing pixels.

46. (Previously Presented) The device as in claim 45, wherein each optical element spatially covers only one sensing pixel.

47. (Previously Presented) The device as in claim 45, wherein each optical element spatially covers at least two adjacent sensing pixels.

48. (Previously Presented) The device as in claim 41, wherein said sensing pixels are formed of a first set of contiguous multiple pixel layers and a second set of contiguous pixel layers fabricated on said substrate, and wherein said optical mask layer is formed between said first set and said second set.

49. (Previously Presented) The device as in claim 41, wherein each sensing pixel is an active pixel which has in-pixel circuit elements to convert radiation-induced charge into a current or voltage.

50. (Previously Presented) The device as in claim 41, wherein each optical element spatially covers only one sensing pixel.

51. (Previously Presented) The device as in claim 41, wherein each optical element spatially covers at least two adjacent sensing pixels.

52. (New) An imager, comprising:

a plurality of pixel cells configured to convert incident light into an electrical signal, each pixel cell comprising a plurality of pixel layers; and

an optical layer between two of said plurality of pixel layers,

wherein said optical layer is configured to modify the incident light prior to conversion by the pixel cells.

53. (New) The imager of claim 52, wherein the optical layer comprises a plurality of optical elements, each configured to focus the incident light on a respective pixel cell.

54. (New) The imager of claim 53, wherein the optical layer comprises a plurality of optical elements, each configured to spectrally filter the incident light prior to conversation by the pixel cells.

55. (New) The imager of claim 52, wherein the optical layer is further configured to separate the incident light into constituent colors.

56. (New) The imager of claim 55, wherein the optical layer is further configured to focus each color of the incident light onto a respective pixel cell.

57. (New) An imager, comprising:

a plurality of pixel layers defining a plurality of pixel cells; and

a plurality of optical layers disposed between the plurality of pixel layers,

wherein the optical layers are configured to focus incident radiation on the pixel cells.

58. (New) The imager of claim 57, wherein the optical layers each comprise a plurality of optical elements, each configured to focus incident radiation on a respective pixel cell.

59. (New) The imager of claim 58, wherein successive optical elements along the path of the incident light are configured to focus the incident light into an increasingly narrow beam.

60. (New) The imager of claim 57, wherein at least one pixel layer is disposed between each of the plurality of optical layers.

61. (New) An imager, comprising:

a plurality of pixel cells; and

an optical element associated with each pixel cell,

wherein each optical element is configured to spectrally filter incident light and focus the incident light on a respective pixel.

62. (New) The imager of claim 61, wherein each pixel cell is configured to sense one of red, green, or blue light.

63. (New) The imager of claim 62, wherein each optical element is further configured to filter the incident light such that only light of the color associated with an underlying pixel cell is transmitted to the underlying pixel cell.

64. (New) The imager of claim 63, wherein each optical element is further configured to focus incident light of a color other than the color associated with the underlying pixel cell on an adjacent pixel cell.

65. (New) The imager of claim 61, wherein the optical elements form a Bayer-patterned color filter array.

66. (New) The imager of claim 65, wherein a first optical element associated with a red portion of the color filter array is configured to pass red light through to a first pixel cell underlying the first optical element, diffract blue light to a second pixel cell adjacent to the first pixel cell, and diffract green light to a third pixel cell adjacent to the first pixel cell.

67. (New) The imager of claim 66, wherein a second optical element associated with the second pixel cell is configured to pass blue light through to the second pixel cell, diffract red light to the first pixel cell, and diffract green light to the third pixel cell.

68. (New) The imager of claim 67, wherein a third optical element associated with the third pixel cell is configured to pass green light through to the third pixel cell, diffract red light to the first pixel cell, and diffract blue light to the second pixel cell.